

Lethbridge High School iGEM Team 2016

THE DICTIONARY

A Guide to Better Understanding the 2016
Lethbridge High School iGEM Team's Blood
Clotting Project

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Antimicrobial Peptide (AMP): molecular proteins with a wide spectrum of antimicrobial activity against bacteria, viruses and fungi

***Cerastes cerastes*:** viper species living in the Northern African deserts whose venom results most noticeably in hemorrhage (also known as Desert Horned Viper)

Cerastocytin: a serine protease found in the venom of *Cerastes cerastes* viper that acts as a thrombin substitute and, by skipping many steps of the blood clotting pathway, results in an increased rate of coagulation

Coagulation: the process of blood clotting (often at a wound site)

Electrophoresis: a method of separating molecules such as DNA for further analysis

Erythrocyte: primary oxygen transporter in the cells of animals (also known as a red blood cell)

Eukaryote: organisms whose cells contain well defined nuclei and membrane-enclosed organelles (eg. Animals, plants, fungi etc.)

Exon: any part of a gene that will become part of the final mature mRNA produced by that gene after introns have been removed by RNA splicing; refers to both the DNA sequence within a gene and the resulting sequence in RNA transcripts

Fibrinogen: large, soluble and complex glycoproteins that are converted by thrombin into insoluble fibrin strands which are then cross-linked by Factor XIII to form a blood clot

Fibrin: protein involved in the blood clotting pathway that is formed from the polymerization of inactive fibrinogen by thrombin and cross-links with each other to form a clot over the wound

Factor XIII: an enzyme in the blood clotting pathway that cross-links individual fibrin strands, resulting in a blood clot

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Glycosylation: the enzymatic process that attaches glycans (sugars) to proteins, lipids and other organic molecules

Hemoglobin: a protein found in the blood of vertebrates that transports oxygen and contains an iron atom bound to it

Heparin: an anticoagulant that prevents the formation of blood clots (also known as a blood thinner)

Hemorrhage: varying degrees of blood loss (commonly referred to as bleeding)

IPTG: a molecule that mimics lactose and induces transcription by a Lac promoter by binding to the Lac repressor (LacI)

Leukocyte: a colourless cell that circulates in the blood and body fluids and is involved in counteracting foreign substances and disease (also known as a white blood cell); there are several types including lymphocytes, granulocytes, monocytes, and macrophages

Lysis: the disintegration of a cell through the rupture of the wall or membrane

Miniprep: a method used to isolate plasmid DNA from bacteria

N-terminus: the start of a protein or polypeptide terminated by an amino acid with a free amine group (NH₂)

Prokaryotes: single celled organisms that do not have a distinct nucleus or specialized organelles (eg. Bacteria)

Promoter: region of DNA that initiates transcription of a particular protein

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Ribosome Binding Site (RBS): RNA sequence found in mRNA to which ribosomes can bind and initiate translation into amino acids in order to form proteins

Signal Sequence: short peptide located at the N-terminus of the majority of newly synthesized proteins

Terminator: genetic parts usually occurring at the end of a gene that cause transcription to stop

Thrombin: an enzyme involved in the blood clotting pathway that polymerizes inactive fibrinogen into fibrin strands that cross-link to form a blood clot

Thrombosis: local coagulation in parts of the circulatory system

Transcription: the first step of gene expression, in which a particular segment of DNA is copied into mRNA by the enzyme RNA polymerase

Transformation: the process by which foreign DNA is introduced into a cell, usually performed by placing the cell under stress conditions (rapid cooling and heating) along with a plasmid, causing the cells to uptake the foreign DNA in hopes of surviving the stressor

Translation: the second step of gene expression, in which mRNA created in transcription is decoded by a ribosome in order to form polypeptide chains

Vasoconstriction: the constriction of blood vessels, causing the blood pressure to increase

Vasodilation: the dilation of blood vessels, causing the blood pressure to decrease

Vector: a vehicle that is used to transport genetic materials (ie. DNA sequences) from the donor organism to the target cell of the recipient organism (eg. Plasmid)